

REMARKS

By this amendment, claims 11, 17 and 19 have been amended. Thus, claims 11-13 and 15-28 are now active in the application. Reexamination and reconsideration of the application are respectfully requested.

On pages 2-7 of the Office Action, claims 11-13, 17-19, 22, 25 and 28 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann et al. (U.S. 4,398,775) in view of Lindrose et al. (U.S. 6,113,277); claims 15 and 16 were rejected under 35 U.S.C 103(a) as being unpatentable over Hofmann et al. in view of Lindrose and Albrecht et al. (U.S. 5,768,060); and claims 20, 21, 23, 24, 26 and 27 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hofmann et al. in view of Lindrose et al. and Mouri et al. (U.S. 6,010,247). These rejections are respectfully traversed in part and are believed clearly inapplicable to the presently-amended claims, for the following reasons.

Each of the independent claims 11, 17 and 19 has been amended to specify that, in the bearing device of the present invention, the first and second balls are supported without pre-load by the first and second inner rings and the first and second outer rings. In particular, with exemplary reference to the present drawing figures, each of the independent claims now specifies that the first inner ring 301 and the first outer ring 303 are configured to support the first balls 231-233 without pre-load, and that the second inner ring 302 and the second outer ring 304 are configured to support the second balls 241-243 without pre-load. This feature of the present invention is fully supported in the original specification at, for example, page 15, lines 12-17, and in the substitute specification filed February 15, 2006, at page 15, lines 16-21, as well as in Fig. 6B. With this now specifically-recited feature of the present invention, the construction of the present invention has the advantage that, since the balls 231-233 and 241-243 are supported without pre-load, elastic deformation of the balls and bearings, and frictional losses of the bearings, can be minimized. As such, cost reduction can be achieved by using a minimum number of balls (i.e. in the preferred embodiment, three first balls 231-233, and three second balls 241-243). This advantage of the present invention is described in the original specification at page 16, lines 5-11 and, in the substitute specification filed February 15, 2006, at page 16, lines 9-15.

Thus, in addition to the arguments presented at page 9, line 24 - page 10, line 23 of the October 5, 2006 response, it is submitted that the present invention as recited in the independent claims 11, 17 and 19 is clearly patentable over the prior art of record in view of these newly-recited features and the advantages provided thereby.

In particular, it is submitted to be apparent that the Hofmann et al. patent provides no teaching or suggestion of providing first inner and outer rings configured to support first balls without pre-load, and second inner and outer rings configured to support second balls without pre-load. In Hofmann et al., it is described, for example, that the balls 5 are loaded along lines 14, in the same direction as during operation (see column 3, lines 14-20 of the Hofmann et al. patent). The Lindrose et al. patent also contemplates a pre-load force (see, for example, column 2, lines 59-64, column 4, lines 17-21, the brief description of Fig. 3 at lines 37 and 38 of column 4, and also at column 5, line 65 - column 6, line 5).

Accordingly, it is submitted to be apparent that the Hofmann et al. and the Lindrose et al. patents do not contemplate the arrangement as now recited in the independent claims 11, 17 and 19, and furthermore, there is no teaching or suggestion in the prior art that would have motivated a person of ordinary skill in the art to modify the Hofmann et al. arrangement or to make any combination of the references of record in such a manner as to result in or otherwise render obvious the present invention of claims 11, 17 and 19. Therefore, it is respectfully submitted that claims 11, 17 and 19, as well as the claims depending therefrom, are clearly allowable over the prior art of record.


Next, with reference to the present invention as recited in claims 20, 23 and 26, it is submitted that, although the Mouri et al. patent shows a bearing device having an inner sleeve with an axial hole therethrough, there is no teaching or suggestion in the prior art of record which would have motivated a person of ordinary skill in the art to modify the Hofmann et al. patent or the Hofmann et al./Lindrose et al. combination in such a manner as to result in or otherwise render obvious the present invention of these dependent claims. Rather, it is submitted that the Examiner has simply located the recited feature in the Mouri et al. et al. reference, using applicant's claims as a blueprint and modifying the prior art based on such a blueprint, thereby constituting impermissible hindsight

In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice thereof is earnestly solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, it is respectfully requested that the Examiner contact the undersigned by telephone in order to resolve such issues.

Respectfully submitted,

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